

AMENDMENTS TO THE CLAIMS

Please amend the claims to be as follows, where markings are included to show changes made.

1. (currently amended) A method of rapidly selecting a physical memory locality in response to a memory fault event to accomplish efficient memory allocation in a multiprocessor system which includes a plurality of cells and shared memory distributed across the cells, wherein each cell includes at least a portion of the shared memory, the method comprising:

receiving from a requesting processor in one of said cells a request to access a virtual memory address;

checking for a translation of said virtual memory address to a corresponding physical address; and

if said translation is not found, then performing steps of:

sending a locality request to a virtual memory fault handler, the locality request including an indication of a search policy to use from among a plurality of search policies;

forming a data structure based on physical memory localities at the cells within the system and the search policy that was indicated, said data structure including sets of equidistant physical memory localities from said requesting processor; and

selecting a preferred physical memory locality using a pointer to a locality within said data structure.
2. (canceled)

3. (previously presented) The method of claim 1, wherein the physical memory localities include local memories at the cells in the system.
4. (previously presented) The method of claim 3, wherein the plurality of search policies includes a "closest first" policy.
5. (original) The method of claim 3, wherein the physical memory localities further includes interleaved memory in the system.
6. (previously presented) The method of claim 5, wherein the plurality of search policies further includes an "interleaved first" type of policy.
7. (previously presented) The method of claim 1, wherein the selection of the preferred locality is performed using a get "best"/"next best" iteration procedure.
8. (canceled)
9. (original) The method of claim 1, wherein the determination of the preferred locality includes changing to a next equidistant set if there is no memory available in any locality of a current equidistant set.
10. (original) The method of claim 9, further comprising returning an indication that no locality is available if no locality within any of the equidistant sets has sufficient memory.
11. (currently amended) A multiprocessor computing system, the system comprising:
 - multiple symmetric multiprocessing (SMP) nodes;
 - multiple central processing units (CPUs) at each SMP node;

a memory control unit at each SMP node which is coupled to each CPU at that SMP node;

shared memory at each SMP node which is accessible by way of the memory control unit at that SMP node;

a switching system coupled to the memory control units so as to interconnect the multiple SMP nodes;

an operating system running on the CPUs;

a virtual memory (VM) fault handler within the operating system; and

a VM locality module within the operating system,

~~wherein the VM locality module is configured to receive a locality request from the VM fault handler, the locality request including an indication of a search policy to use from among a plurality of search policies, and is further configured to form a data structure based on the search policy that was indicated.~~

wherein the operating system is configured to:

receive from a requesting CPU in one of said SMP nodes a request to access a virtual memory address;

check for a translation of said virtual memory address to a corresponding physical address; and

if said translation is not found, then the operating system is configured to: send a locality request to the VM fault handler, the locality request including an indication of a search policy to use from among a plurality of search policies;

form a data structure based on physical memory localities at the SMP nodes within the system and the search policy that was indicated, said data structure including sets of equidistant physical memory localities from said requesting CPU; and select a preferred physical memory locality using a pointer to a locality within said data structure.

12. (canceled)
13. (previously presented) The system of claim 11, wherein the shared memory includes both local memory and interleaved memory, and wherein the plurality of search policies include at least a closest first search policy and an interleaved first search policy.
14. (previously presented) The system of claim 13, wherein the data structure for the closest first search policy comprises a first set including a closest local memory locality and one or more other sets of equidistant localities.
15. (original) The system of claim 14, wherein the other sets include an interleaved memory locality.
16. (canceled)
17. (canceled)
18. (previously presented) The system of claim 13, wherein the data structure for the interleaved first search policy comprises a first set including an interleaved memory locality and a set including local memory localities.
19. (canceled)
20. (canceled)
21. (canceled)
22. (currently amended) A multiprocessor computing system configured so as to rapidly select physical memory localities to accomplish efficient memory

allocation, the multiprocessor computing system comprising an operating system which includes:

a virtual memory manager configured for extending a memory space beyond limits of a physical address space;

a virtual memory fault handler configured to interrupt execution of the virtual memory manager when a page fault occurs; and

a virtual memory locality module configured to receive a locality request from the virtual memory fault handler, to form a data structure having sets of equidistant physical memory based on a search policy indicated in the locality request, and to rapidly select a physical memory locality in the system using a pointer to the data structure.

wherein the virtual memory manager is configured to:

receive from a requesting processor a request to access a virtual memory address;

check for a translation of said virtual memory address to a corresponding physical address; and

if said translation is not found, then the virtual memory manager is configured to:

send a locality request to the virtual memory fault handler, the

locality request including an indication of a search policy to use from among a plurality of search policies;

form a data structure based on physical memory localities within the multiprocessor computing system and the search policy that was indicated, said data structure including sets of equidistant physical memory localities from said requesting processor; and

select a preferred physical memory locality using a pointer to a locality within said data structure.

23. (previously presented) The method of claim 1, wherein the pointer is rotated amongst localities within a current equidistant set so as to provide for round-robin type selection amongst those equidistant physical memory localities.
24. (previously presented) The system of claim 11, wherein the VM locality module is further configured to determine a preferred locality using a pointer to a locality within the data structure.